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ABSTRACT

This study investigates the family and school influences on reading and mathematics achievement for students in a voluntarily desegregated school district. General findings suggest that the best main-effects predictors of both reading and mathematics achievement are prior levels of achievement in each area. However, further analysis of the data indicate that the influence of such variables as prior achievement, student race, teacher race and student achievement vary with other student characteristics. This analysis also suggests that high ability, low socioeconomic students and high ability black students derive the greatest relative benefit and that exposure to white teachers is most beneficial for low socioeconomic level students. Based on these findings, it would appear that the voluntary desegregation of this particular school had no adverse influence on the achievement of either black or non-black students. In fact, a descriptive analysis suggests that achievement gains for both black and non-black students compare favorably with a national norm group. (Author/EB)

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# Summative Analysis of Longitudinal Student Achievement Data in a Desegregated School District*

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Abstract

This study investigated the family and school influences on reading and mathematics achievement for students in a voluntarily desegregated school district. Not unexpectedly the best main-effects predictors of both reading and mathematics achievement are prior levels of achievement in each area. However, further analysis of the data indicated that the influence of such variables as prior achievement, student race, teacher race and student achievement vary with other student characteristics. Specifically high ability, low socioeconomic students and high ability black students appear to derive the greatest relative benefits. Moreover, exposure to white teachers appear most beneficial for low socioeconomic level students. A descriptive analysis of reading and mathematics gain scores indicates favorable comparisons with a norm group.

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Clearly the desegregation of American schools and its attendant social and educational outcomes is among the more controversial issues in American education. Beginning with Equality of Educational Opportunity (Coleman, et al., 1966) the effects of desegregation on the academic achievement of various minority and non-minority student groups have been the focus of numerous investigations (e.g. Beers, and Reardon, 1974; Armour, 1972a, 1972b, 1974; Cohen, Pettigrew, and Riley, 1972; Crain, 1971; Jencks, 1972, 1973; Frary and Goolsby, 1970; McPartland, 1969; St. John, 1975; St. John and Lewis, 1971; Wilson, 1967). In a critical review of much of the earlier research Jencks, et al. (1972) concludes that any case for or against school desegregation cannot justifiably be made solely on the basis of improved test scores for minority children, since on the avarage desegregation raises black test scores by only 2-3 points (p. 106).

More recent reviews of research on desegregation, however, have been somewhat less pessimistic, although it is clear that the findings are, at best, mixed. Weinberg (1977) concludes that the "achievement of minority children usually rises when they learn together with other children" (p. 122), no matter how desegregation was accomplished. However, Stephan's (1978) conclusion that "the achievement level of blacks sometimes increases and rarely decreases in desegregated schools" (p. 217) is somewhat less sanguine. Even less optimistic is Bradley and Bradley's (1977) thorough review which attempted to relate the direction of results to methodological rigor. They concluded that while many studies indicate positive effects associated with school desegregation, each of the studies reporting positive

desegregation effects suffered from one or more methodological flaws which called the validity of the findings into question.

Unfortunately even in the area of methodological adequacy there is considerable diversity of opinion. Recently, Crain and Mahard (1979) in a review of 73 studies of the influence of desegregation on black achievement concluded that desegregation has a beneficial effect on black achievement and, in contrast to Bradley and Bradley (1977), that it is the methodologically weaker studies which are less likely to show positive desegregation effects. Crain and Mahard also make the additional, and perhaps particularly significant observation that desegregation is more likely to positively influence black test scores if it begins in the earliest elementary grades.

Clearly it is most difficult to draw any firm generalizations from these reviews, particularly when they reach rather dissimilar conclusions subsequent to reviewing the same investigations. As a result, one might do well, at least until the evidence of desegregation effects on achievement is more consistent, to take the Jencks' et al. (1972) advice that the rationale for desegregated schools should be made on the expectation of social and cultural rather than strictly cognitive outcomes. (In Jencks' own words, "if we want a desegregated society we should have desegregated schools", p. 106.)

This does not imply the abandonment of traditional models of research on desegregation, but would rather entail, as alluded to by Bradley (1978), attempts to study the differing influences on achievement and achievement motivation for different kinds of students within segregated and desegregated school systems. In an extenstion of this line of reasoning the present study is an exploratory investigation of the various family, teacher and school influences on reading and mathematics achievement in a school district which implemented a district-initiated, voluntary desegregation program in 1974.

## METHOD

### Design and Sample

The study was conducted in the Park Forest School District, Park Forest, Illinois, a suburb of Chicago. The Park Forest School District implemented a district-initiated, voluntary desegregation program in 1974. The data

for this study are longitudinal with initial data collections in 1974 and final data collections in 1978.

The initial overall sample was selected in 1974 from all elementary schools in the district. Thus, the sample was chosen when the students were in the third grade and was followed until grade seven (1978). Of course not all students selected in 1974 were still in the Park Forest system in 1978. Students who left during the period were retained in the sample so that data on them up until their departure could be included in at least a portion of the analyses. Similarly data on students immigrating into the district were added to the sample. In order to control, at least to some extent, for turnover in students, an additional variable measuring years in the Park Forest School System was included in certain of the analyses.

## Variables

The variables in the study can be generally categorized under four broad headings:

1. achievement data
2. family and student characteristics
3. school and teacher contacts
4. school support programs

Table 1 lists and briefly describes the variables under each heading. There were two sets of dependent variables: total reading scores 1975-1978, and total mathematics scores 1975-1978.

## Data Analysis

The data analyses in this study were conducted in two stages: 1) an inferential stage which focused on the influences of family, school and special program variables on achievement; and 2) a descriptive stage which compared achivement gains made within the system to those made by a national norm group.

Multiple regression analysis with 1975-1978 reading and math scores as the dependent variables was the major inferential statistical procedure employed in stage 1. For 1975, 1976 and 1977 reading and mathematics achievement the predictor variables were: 1974 reading or math achievement (as appropriate),

race, parents' socioeconomic status, block socioeconomic status, number of siblings, birth order, sex, Title 1, Title 1 summer school, percent white teachers, average number of days absent/year and average teacher effectiveness ratings. For 1978 reading and mathematics achievement the set of predictors was the same with two exceptions: 1) number of years in the Park Forest System was included and 2) 1976 achievement replaced 1974 achievement so that students who entered the system after 1974 would not be lost to the analysis. (The number of students entering the system in 1977 was extremely small.)

In addition to the main effects, a number of cross-product terms were added to the equation in a subsequent set of analyses to determine the presence of interactions among variables. The presence of significant interactions would indicate that the influence of certain variables is different for different kinds of students. For example the extent of influence of teacher race on student achievement may vary for students of different races or different socioeconomic levels. Similarly, the achievement benefits of exposure to the Park Forest System might accrue differentially to blacks or whites of differing ability levels. The characteristics of individual interactions were investigated only if they make a significant contribution to $R^2$ with the influence of all main effects and all other interactions controlled.

In addition to the inferential analyses, the achievement gains of Park Forest students were compared descriptively with those of a national norm group. Thus, a second stage of the data analyses presents raw gain-score comparisons between different student subgroups within the Park Forest system and a norming population. While such comparisons lack the statistical rigor of inferential analyses, they might offer somewhat more meaningful data to policy makers.

## RESULTS AND CONCLUSIONS

### Inferential Analyses

Table 2 presents the main effects results of the multiple regression analyses. Because of missing data on certain variables and simple attrition of subjects, the sample Ns for all eight analyses varied from 139 to 189. As indicated by Table 2, only one variable--prior

reading or mathematics achievement--had consistent significant associations with predicted achievement when the influence of all other variables in the model was held constant. Prior achievement also accounted for by far the greatest proportion of unique variance ($R^2$ ranging from .35-.48). None of the remaining predictors made greater than a 2% unique contribution to explained variance.

Six other variables had a significant unique influence on achievement scores, although the partial associations were not consistently significant across all eight analyses: 1) being a black student was negatively associated with 1977 and 1978 reading achievement; 2) level of parents' socioeconomic status was positively associated with 1975 and 1977 reading achievement; 3) birth order in the family was negatively associated with 1978 reading achievement; 4) being female was negatively associated with 1975, and 1976 and 1977 reading achievement; 5) percent white teachers was positively associated with 1976 mathematics achievement; and 6) participation in Title 1 was negatively associated with 1975, 1976 and 1977 mathematics achievement. (Rather than indicating a negative influence of Title 1 on mathematics achievement, this last finding seems more likely to reflect the fact that Title 1 participants were chosen initially from students with the lowest mathematics achievement performance.)

Table 3 displays the regression equations for four significant interactions yielded by the addition of the cross-product terms to the main-effects equations. The unstandardized regression weights in the equations reflect the net influence of each term with the influence of all main effects and all other interactions in each equation held constant. As Table 3 indicates, a measure of socioeconomic status significantly interacted with prior achievement (1974 reading) and percent white teachers in the prediction of both 1977 reading achievement and 1975, 1977 mathematics achievement. Race interacted with prior achievement (1976 mathematics) in the prediction of 1978 mathematics achievement.

The signs of the regression weights shown in Table 3 indicate that the characteristics of the SES x 1974 reading score interaction could generally be termed compensatory. That is, prior achievement or ability

(as measured by 1974 reading scores) was most strongly related to subsequent (1977) reading achievement for students at relatively low socioeconomic levels. Thus, while socioeconomic status was in general positively related to 1977 reading achievement, the gap between high and low SES students with low ability was considerably greater than the corresponding gap at high ability. In short, if attending school in the Park Forest System can be considered exposure to a desegregated environment, there is at least some indication that the group which appeared to derive greatest relative benefits in this environment were low socioeconomic level students with high ability.

A conceptually similar interaction was also indicated between race (coded black = 2; non-black = 1) and prior achievement or ability (1976 math) in the prediction of subsequent (1978) mathematics achievement. Specifically, 1976 achievement was more strongly associated with 1978 achievement for black than it was for non-black students. Thus, while there was an overall achievement advantage held by non-black students, the gap between blacks and non-blacks varied with level of prior achievement such that there was a greater gap for low ability (1976 achievement) than for high ability students. Again, if one perceives attendance in the Park Forest System as exposure to a desegregated schooling environment, the finidngs at least suggest the possibility that high ability blacks derive the greatest relative benefits.

Also classifiable as compensatory were the two interactions between student socioeconomic status and percent white teachers. Percent white teachers had their strongest positive influence on 1975 and 1977 mathematics achievement for students at the relatively lowest socioeconomic levels. As level of socioeconomic status increased,the influence of degree of exposure to white teachers became less important as an influence on achievement.

Descriptive Analyses

Although some of the rigor associated with statistical inference is sacrificed, another way to examine academic achievement is simply through a descriptive presentation of grade equivalent gains across the four years as compared to national norms. Tables 4a and 4b show the gain score data by year and across the four years in reading and mathematics for all students, different ability levels, and by race. From Tables 4a and 4b we note the following:

1. At the time of desegregation (1974), the students had a mean grade equivalent score at or slightly below the national norms. Each subsequent year the total group achieved somewhat above the mean of the national norms. By 1978 the total group obtained an accumulated grade equivalent score of .88 years in reading and .87 years in mathematics above that of the norming group. This indicates that the Park Forest students' gains in grade equivalents in both subjects was nearly one year greater than the norming group. The total group was not adversely affected by desegregation; rather, such data suggest that desegregation may function to enhance achievement, generally.

2. Over the four year period, all ability groups exceeded the national norming group in grade equivalent gains in mathematics and reading but for the low ability group in reading. In this instance, the differences were only .02 below that of the norming group.

3. All non-black students, regardless of ability level, exceeded the four-year norming group gains in both reading and mathematics. Moreover, while low ability non-black students were more than a year below the norms in 1974 in both subjects, in 1978 they were more than one-half year above the norming group.

4. The high ability black students exceeded the gains of the norming group in both reading and mathematics over the four year period; however, they entered with scores above the norming group. High ability black students made greater achievement gains in mathematics than the high achieving non-black students over the four year period; however, the gap between the black and non-black students widened somewhat in reading. Figure 1 illustrates the change in achievement gap between the two groups.

5. The average ability black students were slightly below the national norming group in 1974 in both reading and mathematics, but were slightly above the norming group four years later in both subject areas.

6. The low ability black students were a year below the national norming group in mathematics in 1974 and just less than one-half year below by 1978. In reading (1974) the low ability black students were over one-and-a-half years below the norms and less than one-half year below by 1978.

These finidngs suggest that relative to a norm population, black students of all ability levels are making academic progress in a desegregated setting and non-white students continue to achieve as well as they did previously, with the low ability non-black students showing exceptional gains.

The general trend of the findings in this study appear to reflect favorably on desegregation. In terms of its influence on achievement, there is little to suggest that the voluntary desegregation of this particular school district had an adverse influence on the achievement of either black or non-black students. Rather there is some evidence, though admittedly descriptive in nature, to at least suggest that achievement gains for both black and non-black students compare favorably with a national norm group.

The specific influences on achievement, however, are difficult to determine. After prior achievement was controlled no other single variable made a consistently significant contribution to subsequent reading or mathematics achievement. Moreover, the finding of interactions among variables suggests that the pattern of influences of family, student and school variables on achievement may be quite complex. Thus, while it may be desirable to seek a parsimonious model for explaining school achievement, future inquiry may need to consider interactive or conditional as well as general or main effects influences if the full range of this complexity is to be captured.

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TABLE 1

CATEGORIES OF VARIABLES

A. Achievement

1. Total California Test of Basic Skills Grade Equivalent Reading score for October, 1974; May, 1975; February, 1976; February, 1977; February, 1978

2. Total California Test of Basic Skills Grade Equivalent Mathematics scores for October, 1974; May, 1975; February, 1976; February, 1977; February, 1978

B. Family and Student Characteristics

1. Parents socioeconomic status
2. Block socioeconomic status
3. Number of siblings
4. Birth order
5. Student sex
6. Student race (black/non-black)

C. School and Teacher Contacts

1. Average number of days absent per year (1974-1977)
2. Average teacher effectiveness rating (1974-1977)[1]
3. Number of years attending Park Forest Schools
4. Percent white teachers (1974-1977)

D. School Support Programs

1. Participation/non-participation in Title 1
2. Participation/non-participation in Title 1 Summer School

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[1] Teachers were rated by administrative staff. For this study ratings from 1 to 3 were assigned with 3 being the most positive. Since between 1974 and 1977 a student may have had teachers with different ratings, ratings of all teachers to whom the student was assigned within the three year period were averaged to determine effect over time of "quality" teaching on the student's academic achievement.

TABLE 2

REGRESSION SUMMARIES (RAW REGRESSION WEIGHTS AND $R^2$ CONTRIBUTIONS)

FOR PREDICTING READING AND MATHEMATICS ACHIEVEMENT

| Variable | Reading | | | | | | | | Mathematics | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1975 | | 1976 | | 1977 | | 1978 | | 1975 | | 1976 | | 1977 | | 1978 | |
| | b | $R^2$ | b | $R^2$ | b | $R^2$ | b | $R^2$ | b | $R^2$ | b | $R^2$ | b | $R^2$ | b | $R^2$ |
| 1974(76) Reading/Math | .895** | .48 | 1.169** | .39 | 1.200** | .35 | .897** | .38 | .842** | .38 | 1.261** | .31 | 1.650** | .39 | 1.084** | .44 |
| Race | -.193 | | -.176 | | -.691* | .01 | -.951** | .02 | -.102 | | -.314 | | -.050 | | -.198 | |
| Parents SES | .009* | .01 | .010 | | .013* | .01 | .018 | | .005 | | -.004 | | .007 | | .002 | |
| Block SES | .087 | | .302 | | .090 | | .206 | | -.003 | | -.011 | | -.138 | | .065 | |
| No. of Siblings | -.065 | | -.35 | | -.010 | | -.094 | | -.043 | | -.134 | | -.016 | | .067 | |
| Birth Order | .090 | | .102 | | .011 | | -.177** | .01 | .055 | | .041 | | -.084 | | -.060 | |
| Sex | -.269* | .01 | -.577* | .02 | -.091 | | -.091 | | -.164 | | -.206 | | .014 | | .322 | |
| Title I | -.089 | | .016 | | .330 | | -.081 | | -.583* | .01 | -1.005* | .02 | -.942* | .02 | -.492 | |
| Title I summer | .065 | | .632 | | 1.499 | | -.079 | | -.356 | | -.330 | | .075 | | -.041 | |
| % White Teachers | .003 | | .182 | | -.006 | | -.005 | | .001 | | .011* | .01 | .006 | | .007 | |
| Avg. days absence 1974-1977 | .011 | | .002 | | .001 | | -.002 | | -.002 | | .003 | | .011 | | .001 | |
| Avg. Teacher Ratings | .049 | | .185 | | .086 | | .013 | | .118 | | .237 | | .266 | | .145 | |
| No. of years in the school system | | | | | | | .063 | | | | | | | | .134 | |
| Constant | -.242 | | .565 | | 2.30 | | 6.173 | | 1.628 | | 2.832 | | 1.148 | | -.454 | |
| Total $R^2$ | | .743** | | .722** | | .693** | | .762** | | .616** | | .647** | | .644** | | .676** |

**$p \leq .01$ *$p \leq .05$

TABLE 3

REGRESSION EQUATIONS FOR FOUR SIGNIFICANT INTERACTIONS

| INTERACTION | F[a] | EQUATION[b] |
|---|---|---|
| 1. Block SES(SES) x 1974 Total Reading Score (74TR) | 5.81* | 1977 Reading = 2.83(SES) + 1.97(74TR) - 0.38(SES x 74TR) - 2.66 |
| 2. Block SES(SES) x Percent White Teachers (% WT) | 7.28** | 1975 Math = 1.59(SES) + 0.03(%WT) - 0.02(SES x %WT) - 1.80 |
| 3. Black SES(SES) x Percent White Teachers (% WT) | 8.02** | 1977 Math = 0.92(SES + 0.08(%WT) - 0.03(SES x %WT) - 2.92 |
| 4. Race (R) x 1976 Total Math Score (76TM) | 4.87* | 1978 Math = -1.48(R) + 0.44(76TM) + 0.41(R x 76TM) + 0.49 |

[a]Unique contribution with all main effects and all other interactions controlled

[b]Unstandardized regression weights with all main effects and all other interactions in the equation.

*$p \leq .05$

**$p \leq .01$

Table 4 A

Comparative Mean and Gain Reading Achievement Grade Equivalent Scores by Year

| | Oct., 1974 | May, 1975 | | | Feb., 1976 | | | Feb., 1977 | | | Feb. 1978 | | | Comparison of 1974-1978 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\bar{X}$ | $\bar{X}$ | Gain[1] | Diff.[2] | $\bar{X}$ | Gain | Diff. | $\bar{X}$ | Gain | Diff. | $\bar{X}$ | Gain | Diff. | Gain | Diff. |
| Nat'l Norm | 3.20 | 3.90 | .70 | -- | 4.60 | .70 | -- | 5.60 | 1.00 | -- | 6.60 | 1.00 | -- | 3.40 | -- |
| Total Group | 3.32 | 4.37 | 1.05 | .35 | 5.21 | .84 | .14 | 6.20 | .99 | -.01 | 7.66 | 1.46 | .46 | 4.34 | .94 |
| Low | 1.71 | 2.82 | 1.11 | .41 | 3.11 | .29 | -.41 | 4.05 | .94 | -.06 | 5.09 | 1.04 | .04 | 3.38 | -.02 |
| Average | 3.35 | 4.14 | .79 | .09 | 5.19 | 1.05 | .35 | 6.37 | 1.18 | .18 | 8.03 | 1.66 | .66 | 4.68 | 1.28 |
| High | 5.08 | 6.12 | 1.04 | .34 | 7.73 | 1.61 | .91 | 8.70 | .97 | -.03 | 9.80 | 1.10 | .10 | 4.72 | 1.32 |
| Non-Black | 3.68 | 4.71 | 1.03 | .33 | 5.79 | 1.08 | .38 | 6.91 | 1.12 | .12 | 8.42 | 1.51 | .51 | 4.74 | 1.34 |
| Low | 1.83 | 3.09 | 1.26 | .56 | 3.68 | .59 | -.11 | 4.76 | 1.08 | .08 | 5.89 | 1.13 | .13 | 4.06 | .66 |
| Average | 3.39 | 4.24 | .85 | .15 | 5.35 | 1.11 | .41 | 6.58 | 1.23 | .23 | 8.33 | 1.75 | .75 | 4.94 | 1.54 |
| High | 5.09 | 6.18 | 1.09 | .39 | 7.71 | 1.53 | .83 | 8.77 | 1.06 | .06 | 9.87 | 1.10 | .10 | 4.78 | 1.38 |
| Black | 2.36 | 3.26 | .90 | .20 | 3.73 | .47 | -.37 | 4.59 | .86 | -.14 | 5.62 | 1.03 | .03 | 3.26 | -.14 |
| Low | 1.64 | 2.60 | .96 | .26 | 2.75 | .15 | -.55 | 3.60 | .85 | -.15 | 4.57 | .97 | -.03 | 2.93 | -.47 |
| Average | 3.19 | 3.55 | .36 | -.46 | 4.33 | .78 | .08 | 5.33 | 1.00 | .00 | 6.62 | 1.29 | .29 | 3.43 | .03 |
| High | 4.98 | 5.60 | .62 | -.08 | 7.96 | 2.36 | 1.66 | 8.07 | .11 | -.89 | 9.32 | 1.25 | .25 | 4.34 | .94 |

[1]Gain score is the grade equivalent gain from the previous year. For example, since 1974 is the first year for which data were gathered, there are no gain score comparisons from 1973. The gain score in 1975 measures the gain from 1974 to 1975, etc.

[2]Diff. is the difference between the gains of each group and the national norming group gains for the specified year. A negative sign in this column indicates that Park Forest made lower gains than did the norming group.

Table 4B
Comparative Mean and Gain Math Achievement Grade Equivalent Scores By Year

| | Oct., 1974 | May, 1975 | | | Feb., 1976 | | | Feb., 1977 | | | Feb. 1978 | | | Comparison of 1974-1978 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\bar{X}$ | $\bar{X}$ | Gain[1] | Diff.[2] | $\bar{X}$ | Gain | Diff. | $\bar{X}$ | Gain | Diff. | $\bar{X}$ | Gain | Diff. | Gain | Diff. |
| Nat'l. Norm | 3.20 | 3.90 | .70 | -- | 4.60 | .70 | -- | 5.60 | 1.00 | -- | 6.60 | 1.00 | -- | 3.40 | -- |
| Total Group | 2.97 | 4.05 | 1.08 | .38 | 4.84 | .79 | .09 | 5.72 | .88 | -.12 | 7.24 | 1.52 | .52 | 4.27 | .87 |
| Low | 2.16 | 3.28 | 1.12 | .42 | 3.59 | .31 | -.39 | 4.57 | .98 | -.02 | 5.82 | 1.25 | .25 | 3.66 | .26 |
| Average | 2.97 | 3.88 | .91 | .21 | 4.77 | .89 | .19 | 5.61 | .84 | -.16 | 6.93 | 1.32 | .32 | 3.96 | .56 |
| High | 3.96 | 5.09 | 1.13 | .43 | 6.61 | 1.52 | .82 | 7.81 | 1.20 | .20 | 9.45 | 1.64 | .64 | 5.49 | 2.09 |
| Non-Black | 3.12 | 4.23 | 1.11 | .41 | 5.23 | 1.00 | .30 | 6.14 | .91 | -.09 | 7.65 | 1.51 | .51 | 4.53 | 1.13 |
| Low | 2.12 | 3.38 | 1.26 | .56 | 4.01 | .63 | -.07 | 4.90 | .85 | -.15 | 6.49 | 1.59 | .59 | 4.37 | .97 |
| Average | 3.00 | 3.97 | .97 | .27 | 4.87 | .90 | .20 | 5.72 | .85 | -.15 | 7.04 | 1.32 | .32 | 4.04 | .64 |
| High | 3.97 | 5.13 | 1.16 | .46 | 6.62 | 1.49 | .79 | 7.85 | 1.23 | .23 | 9.39 | 1.54 | .54 | 5.42 | 2.02 |
| Black | 2.54 | 3.46 | .92 | .22 | 3.85 | .39 | -.31 | 4.75 | .90 | -.10 | 6.02 | 1.27 | .27 | 3.48 | .08 |
| Low | 2.19 | 3.15 | .96 | .26 | 3.14 | -.01 | -.71 | 4.23 | 1.09 | .09 | 5.14 | .91 | -.09 | 2.95 | -.45 |
| Average | 2.83 | 3.49 | .66 | -.04 | 4.31 | .82 | .12 | 5.08 | .77 | -.23 | 6.38 | 1.30 | .30 | 3.55 | .15 |
| High | 3.90 | 4.75 | .85 | .15 | 6.47 | 1.72 | 1.02 | 7.47 | 1.00 | .00 | 10.07 | 2.60 | 1.60 | 6.17 | 2.77 |

[1]Gain score is the grade equivalent gain from the previous year. For example, since 1974 is the first year for which data were gathered, there are no gain score comparisons from 1973. The gain score in 1975 measures the gain from 1974 to 1975, etc.

[2]Diff. is the difference between the gains of each group and the national norming group gains for the specified year. A negative sign in this column indicates that Park Forest made lower gains than did the norming group.



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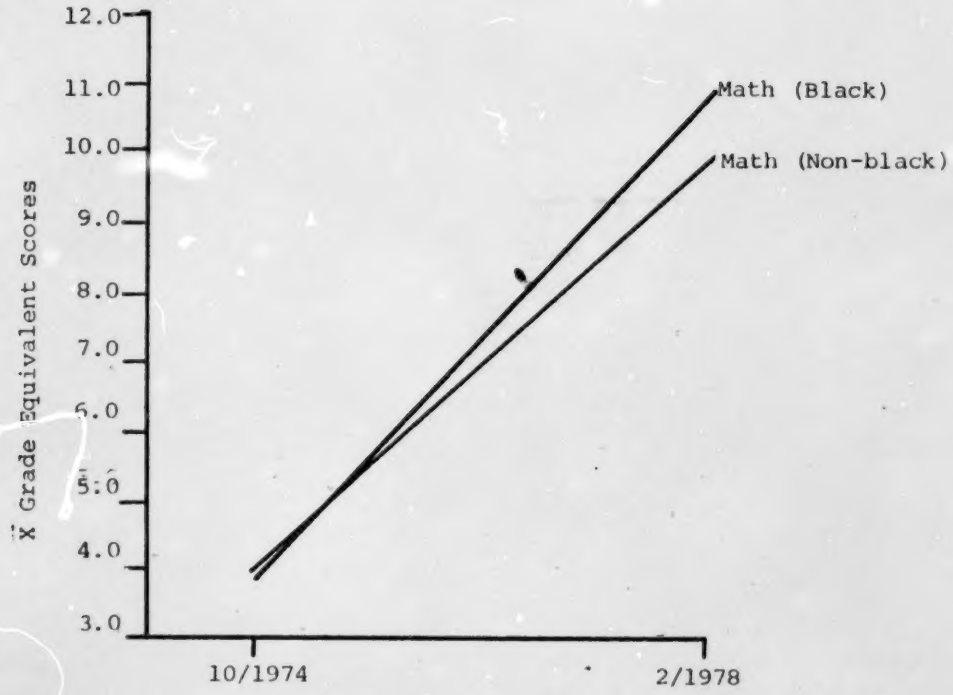


Figure 1. Comparison of High Ability Black and Nonblack Students in Mathematics